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The Status of the Name *Carex sikokiana* Franch. & Sav. and a New Variety, *C. alterniflora* var. *rubrovaginata* (Cyperaceae)

JIRO ODA* AND HIDETOSHI NAGAMASU

*The Kyoto University Museum, Kyoto 606-8501, Japan. *odaj@gaia.eonet.ne.jp (author for correspondence)*

The name *Carex sikokiana* Franch. & Sav. has long been applied to a taxon known in Japan as 'Beni-ito-suge', a species with reddish leaf sheaths and closely related to *C. alterniflora* Franch. Examination of the type specimen, however, revealed that *C. sikokiana* has been misapplied and is synonymous with *C. multifolia* Ohwi var. *stolonifera* Ohwi (Japanese name 'Tsuru-miyama-kan-suge'). We also concluded that *C. multifolia* var. *stolonifera* should be treated at specific rank, distinct from *C. multifolia.* The correct name for it should therefore be *C. sikokiana.* Since 'Beni-ito-suge' has no available scientific name, a new varietal name *C. alterniflora* var. *rubrovaginata* J. Oda & Nagam. is proposed. Lectotypes of *C. alterniflora* var. *fulva* Ohwi and *C. pseudostrigosa* H. Lév. & Vaniot are selected.

Key words: *Carex*, *Carex alterniflora*, *Carex multifolia* var. *stolonifera*, *Carex sikokiana*, Cyperaceae, new variety.

Carex sikokiana Franch. & Sav. was published on the basis of a single specimen from Shikoku, Japan (Franchet & Savatier 1877, 1878). Kükenthal (1909) reduced *C. sikokiana* to *C. tenuissima* Boott var. *sikokiana* (Franch. & Sav.) Kük. together with *C. alterniflora* Franch. and *C. pseudostrigosa* H. Lév. & Vaniot. Following Kükenthal's (1909) treatment, *C. sikokina* has always been treated as closely related to *C. alterniflora.*

Ohwi (1931, 1936) documented *Carex sikokiana* in detail as a distinct species, giving a revised description and citing many specimens from western Japan and Jeju-do, Korea. He also gave it a new Japanese name 'Beni-ito-suge' after its characteristic reddish leaf sheaths (Ohwi 1936). The circumscription of *C. sikokiana* has been accepted by many Japanese authors, although its status was treated variously as *C. sikokiana* (Akiyama 1932, 1955, Masaki *et al.* 2006), *C. sachalinensis* F. Schmidt var. *sikokiana* (Franch. & Sav.) Ohwi (Ohwi 1953), *C. pisiformis* Boott var. *sikokiana* (Franch. & Sav.) T. Koyama (Koyama 1961), *C. pisiformis* subsp. *sikokiana* (Franch. & Sav.) T. Koyama, nom. nud. (Koyama 1964) or *C. alterniflora* var. *sikokiana* (Franch. & Sav.) Katsuy., nom. nud. (Katsuyama 2005).

Figure 2 shows one of the specimens cited by Ohwi (1931, 1936) as *Carex sikokiana.* This specimen has the current year's sterile shoot thin (1.5–2 mm, Fig. 2A [arrowhead a]), the membranous front part of the leaf sheath dark reddish brown (Fig. 2B [arrowhead b]) and nearly the same as the dorsal part, the leaf blades ca. 2 mm wide at their widest, the terminal spike linear (Fig. 2A & C), the sheathing bract with the leaf-like blade overtopping the spike (Fig. 2C [arrowhead c]), and the discoid sessile at the apex of the achene (Fig. 2D [arrowhead d]). These characters are shared by all the specimens cited, except the type in Ohwi (1936).

Our examination of the type specimen of *C.*

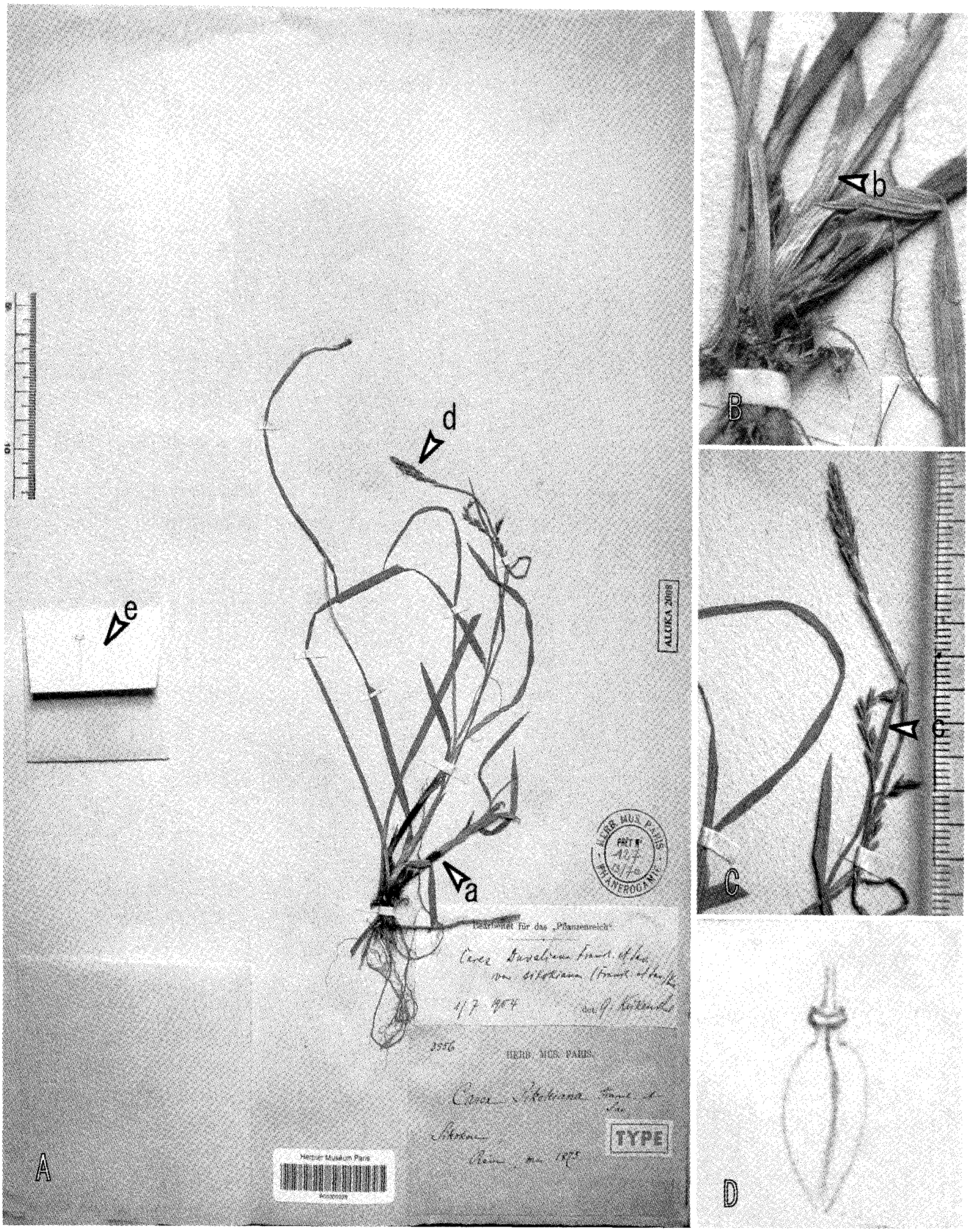
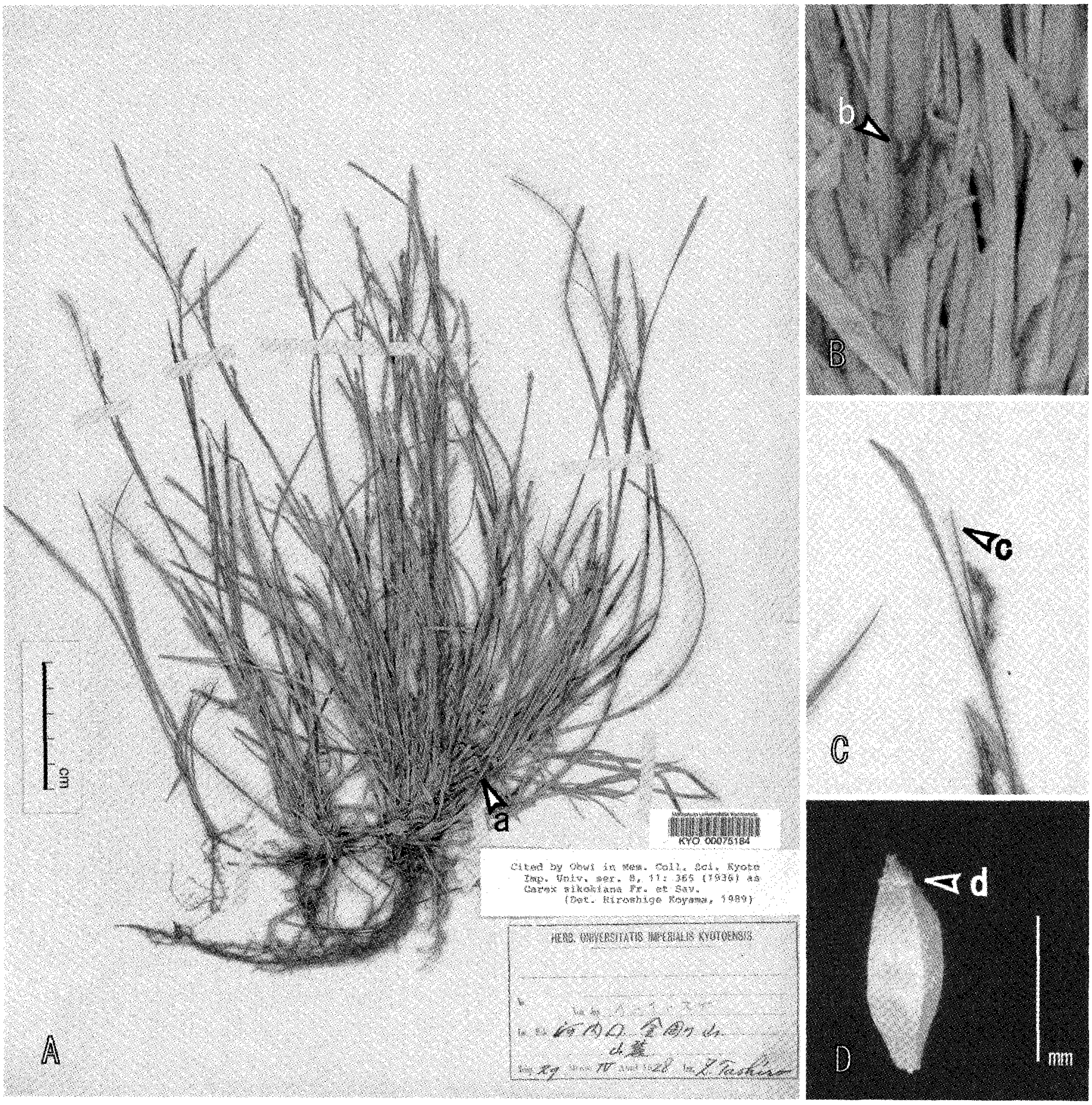


FIG. 1. Holotype of *Carex sikokiana* Franch. & Sav., Sikoku, May 1875, *Rein s.n.* (*Herb. Savatier 3556*) (P). A: whole sheet. B: basal part of plant. C: inflorescence. D: drawing of achene on paper capsule (arrowhead e in A). Arrowheads: (a) sterile shoot of current year, (b) front part of leaf sheath, (c) leaf blade (not bract), (d) staminate spike, (e) drawing of achene.

sikokiana, Rein in Savatier 3556 (Fig. 1), at Herbier National de Paris, Muséum National d'Histoire Naturelle (P), revealed that it has very different characteristics: the current year's sterile shoot is thick (2.5–3 mm, Fig. 1A [arrowhead a]), the membranous front part of the sheath is transparent to light brown (Fig. 1B [arrowhead b]) and different from the reddish dorsal part, the leaf blade is ca. 4 mm wide at the widest, the terminal spike is narrowly elliptic (Fig. 1A [arrowhead d] & C), the sheathing bract nearly lacks a leaf-like blade (Fig. 1A & C), and the discoid of the achenes is shortly stipitate (Fig. 1A [arrowhead e] & D). These features of the type specimen agree with those of *C. multifolia* Ohwi var. *stolonifera* Ohwi.


a
b
c
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A
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KYO 00075184
Cited by Ohwi in Mem. Coll. Sci. Kyoto
Imp. Univ. ser. B, 11: 365 (1936) as
Carex sikokiana Fr. et Sav.
(Det. Hiroshige Koyama, 1989)
HERB. UNIVERSITATIS IMPERIALIS KYOTOENSIS

FIG. 2. Holotype of *Carex alterniflora* Franch. var. *rubrovaginata* J. Oda & Nagam., 29 April 1928, *Z. Tashiro s.n.* (KYO). This specimen was cited as *C. sikokiana* by Ohwi (1931, 1936). A: whole sheet. B: basal leaf sheath. C: upper part of inflorescence. D: achene. Arrowheads: (a) current year's sterile shoot, (b) front part of leaf sheath, (c) bract longer than pistillate spike, (d) discoid sessile at apex of achene.

Carex multifolia var. *stolonifera* is also stoloniferous, has the current year's sterile shoot thick (Fig. 3C [arrowhead c]), the membranous front part of the sheath transparent to light brown and different from the reddish dorsal part, the staminate spike narrowly elliptic (Fig. 3B [arrowhead a]), and the sheathing bracts nearly lacking the leaf-like blade (Fig. 3B [arrowhead b]). Although the type specimen of *C. sikokiana* is smaller than plants that have been called *C. multifolia* var. *stolonifera*, we concluded that they are conspecific.

Carex multifolia is a variable species consisting of several varieties (e.g. Ohwi 1930, 1931, Katsuyama 2005). *Carex multifolia* var. *stolonifera* deviates from other varieties as suggested by Katsuyama (2005). We also reported the branching pattern of *C. multifolia* var. *stolonifera* to be different from the other varieties in having the flower bearing stem always central (Oda & Nagamasu 2007). We therefore concluded that it is more properly treated at specific rank as *C.*

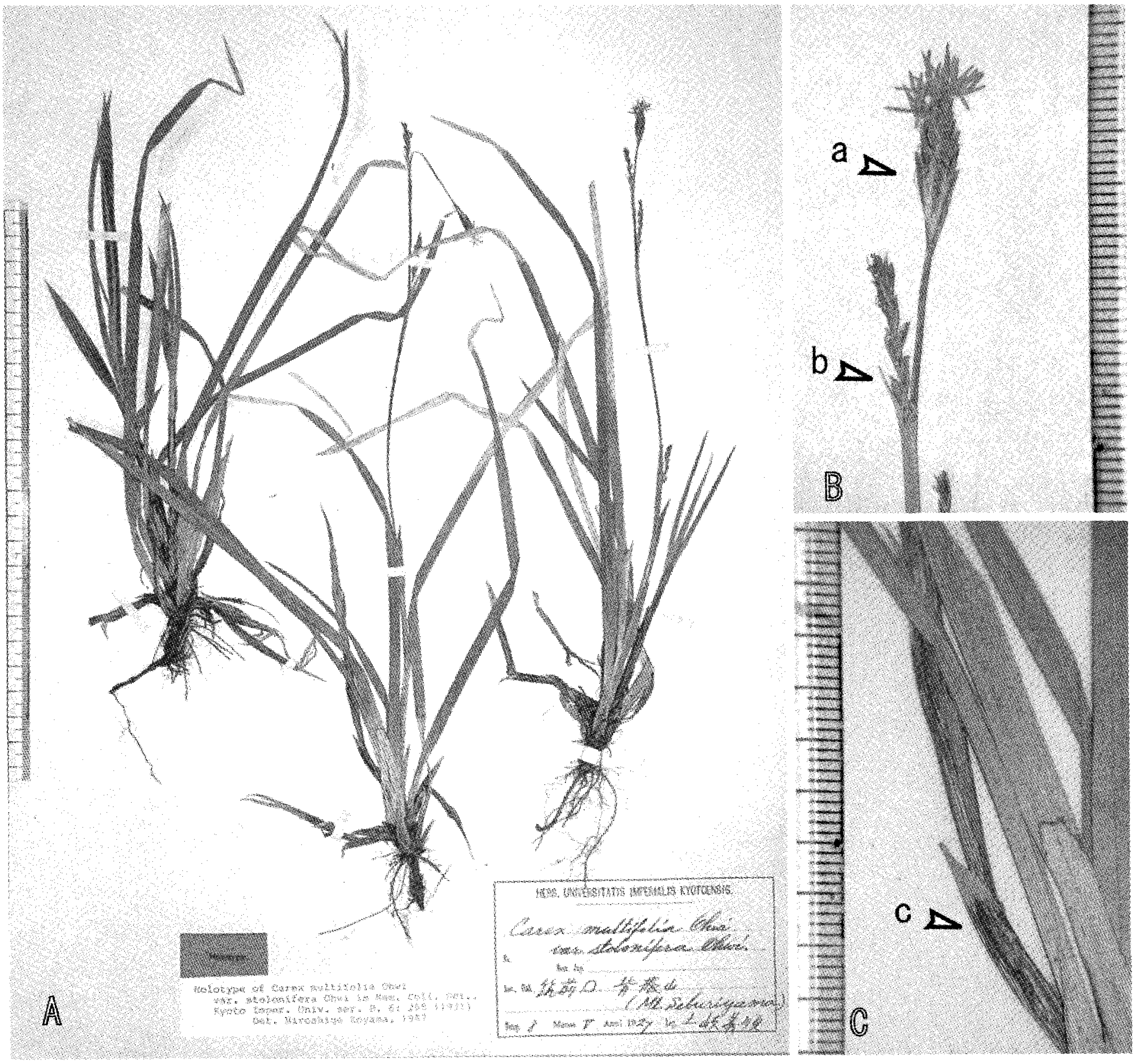

FIG. 3. Holotype of *Carex multifolia* Ohwi var. *stolonifera* Ohwi, *Y. Doki s.n.* (KYO). A: whole sheet. B: inflorescence. C: basal part. Arrowheads: (a) staminate spike, (b) bract shorter than pistillate spike, (c) basal sheath.

sikokiana distinct from *C. multifolia*.

Plants of *Carex sikokiana* sensu Ohwi excluding the type, are similar to *C. alterniflora* (Fig. 4). Such important characteristics shared between *C. sikokiana* sensu Ohwi and *C. alterniflora* are the stoloniferous habit (Fig. 4C [arrowhead b]), thin basal sheaths, sheathing bracts with leaf-like blades overtopping the spike (Fig. 4B [arrowhead a]), linear staminate spikes, and glabrous perigynia with a bidentate beak. The characteristic feature of the former is the reddish basal sheath and of both the staminate and pistillate scales. It is known, however, that *C. alterniflora* is variable in the color of the basal sheath and scales of the spike. We therefore treat this taxon as a new variety, *C. alterniflora* var. *rubrovaginata* J. Oda & Nagam.

Taxonomy

Carex sikokiana Franch. & Sav.

C. sikokiana Franch. & Sav., Enum. Pl. Jap. 2(1): 146 (1877) & 2(2): 573 (1878). –*C. tenuissima* Boott var. *sikokiana* (Franch. & Sav.) Kük., Pflanzenr. (Engler) IV. 20 (Heft 38): 475 (1909). –*C. sachalinensis* Boott var. *sikokiana* (Franch. & Sav.) Ohwi, Bull. Natl. Sci.

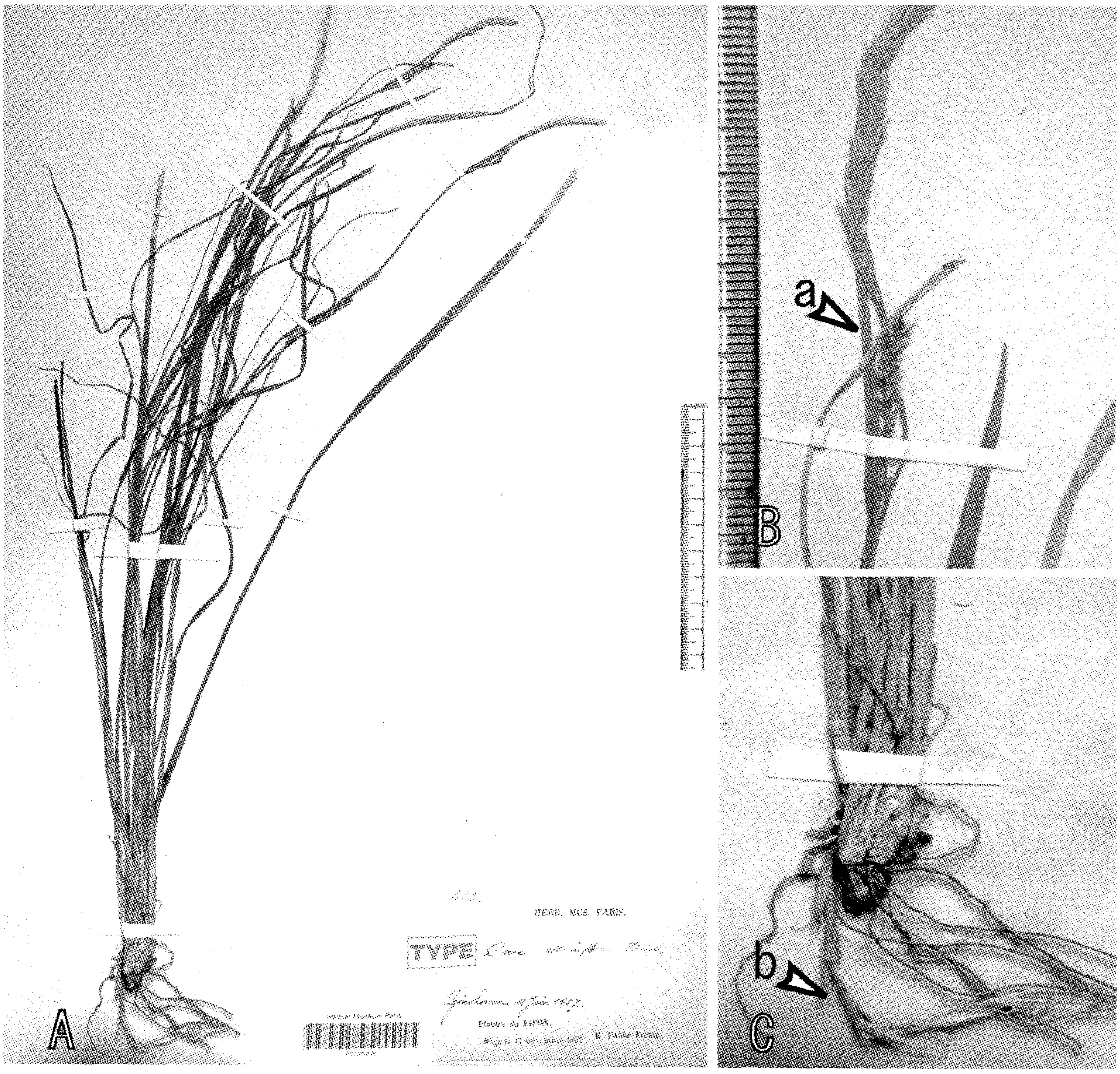

FIG. 4. Holotype of *Carex alterniflora* Franch., *U. Faurie 453* (P). A: whole sheet. B: upper part of inflorescence. C: basal part. Arrowheads: (a) leaf-like blade of bract, (b) stolon.

Mus., Tokyo 33: 67 (1953). –*C. pisiformis* Boott var. *sikokiana* (Franch. & Sav.) T. Koyama, Bot. Mag. Tokyo 74: 329 (1961). –*Type*. JAPAN. Sikok, *Rein in Savatier 3556* (P!)

C. multifolia Ohwi var. *stolonifera* Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 6: 258 (1931). –*Type*. JAPAN. Seburiyama, Kiushiu, *Y. Doki s.n.* (KYO!) *Japanese name*. Tsuru-miyama-kansuge

Note. *Y. Doi* was cited as the collector of the type specimen in the original description, but the collector is probably *Y. Doki*, because that is the name on the label of the specimen.

Carex alterniflora Franch.

Japanese name. Oh-ito-suge.

Key to the varieties of *Carex alterniflora*

1. Basal sheaths pale to light brown
 2. Staminate and pistillate scales yellowish brown ....var. *fulva*
 2. Staminate and pistillate scales pale to light brown
  3. Beak of perigynia 1.2–1.7 mm long.... var. *elongatula*
  3. Beak of perigynia 0.3–1.1 mm long
   4. Staminate spikes 2–3.5 cm long; beak of perigynia 0.6–1.1 mm long.............................. var. *alterniflora*
   4. Staminate spikes 1–2 cm long; beak of perigynia 0.3–0.5 mm long...............................var. *arimaensis*
1. Basal sheaths brown or reddish brown
 5. Basal sheaths brown .... var. *aureobrunnea*
 5. Basal sheaths reddish brown.......... var. *rubrovaginata*

var. **alterniflora**

C. alterniflora Franch., Bull. Soc. Philom. Paris sér. 8, 7: 51 (1895) & Nouv. Arch. Mus. Paris 3. sér. 10: 64 (1898). –*Carex duvaliana* Franch. & Sav. var. *alterniflora* (Franch.) Matsum., Ind. Pl. Jap. 2(1): 108 (1905). –*C. sachalinensis* F. Schmidt var. *alterniflora* (Franch.) Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 67 (1953). –*Carex pisiformis* Boott var. *alterniflora* (Franch.) T. Koyama, Bot. Mag. (Tokyo) 74: 329 (1961). –*Carex pisiformis* Boott subsp. *alterniflora* (Franch.) T. Koyama in Kitam. & al., Coloured Ill. Herb. Pl. Jap. 3: 268 (1964), nom. nud. –*C. sachalinensis* F. Schmidt subsp. *alterniflora* (Franch.) T. Koyama, Fl. Taiwan 5: 336 (1978). —*Type*. JAPAN. Oginohama, *Faurie 453* (P!, iso- KYO!)

C. pseudostrigosa H. Lév. & Vaniot, Bull. Acad. Intern. Geogr. Bot.: 109 (1901). –*C. alterniflora* Franch. var. *pseudostrigosa* (H. Lév. & Vaniot) Akiyama, Caric. Far East. Asia: 198 (1955). —**Lectotype**. JAPAN. Yokosuka, *Faurie 2805* (P!, iso- KYO!), **hic designatus**. (see note below).

C. scabroaristata Akiyama, J. Fac. Sci. Hokkaido Imp. Univ., Ser. 5, Bot. 1(2): 58 (1931). —*Type*. JAPAN. Tajimahara, prov. Musashi, *S. Akiyama s.n.* (SAPS!).

C. sachalinensis F. Schmidt var. *musashiensis* Hiyama, J. Jap. Bot. 29: 160 (1954). –*C. pisiformis* Boott f. *musashiensis* (Hiyama) T. Koyama, Bot. Mag. (Tokyo) 74: 329 (1961). —*Type*. JAPAN. in regione montana Kurasawa ('Kurasowa'), Nippara-mura, prov. Musashi, 30 May 1948, *K. Hiyama s.n.* (TNS, photo!).

Japanese name. Shiro-ito-suge.

Note. *Carex pseudostrigosa* H. Lév. & Vaniot was published on the basis of two specimens, *Faurie 2805* from Yokosuka, and *Faurie 4414* from Kyushu. The latter specimen has been referred to a different species, *C. tenuinervis* Ohwi, which lacks a creeping rhizome (Ohwi 1936, Akiyama 1955). Since the original description clearly mentioned '*radice repente*', *Faurie 2805* (P) with stolons was selected as the lectotype.

var. **arimaensis** Ohwi

C. alterniflora Franch. var. *arimaensis* Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 6(5): 259 (1931). –*C. sachalinensis* F. Schmidt var. *arimaensis* (Ohwi) Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 67 (1953). —*Type*: JAPAN. Arima in Settsu, *Z. Tashiro s.n.* (KYO!).

Japanese name. Arima-ito-suge.

var. **aureobrunnea** Ohwi

C. alterniflora Franch. var. *aureobrunnea* Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 6(5): 259 (1931). –*C. sachalinensis* F. Schmidt var. *aureobrunnea* (Ohwi) Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 67 (1953). –*Carex pisiformis* Boott var. *aureobrunnea* (Ohwi) T. Koyama, Bot. Mag. (Tokyo) 74: 328 (1961). –*Carex pisiformis* Boott subsp. *aureobrunnea* (Ohwi) T. Koyama in Kitam. & al., Coloured Ill. Herb. Pl. Jap. 3: 268 (1964), nom. nud. —*Type*. JAPAN. Atamura in Hikigori, Satsuma, *T. Nishikami s.n.* (KYO!).

Japanese name. Cha-ito-suge.

var. **elongatula** Ohwi

C. alterniflora Franch. var. *elongatula* Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 6(5): 260 (1931). –*C. sachalinensis* F. Schmidt var. *elongatula* (Ohwi) Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 68 (1953). –*C. pisiformis* Boott var. *elongatula* (Ohwi) T. Koyama, Bot. Mag. (Tokyo) 74: 328 (1961). —*Type*. JAPAN. Motoyama in Mts. Kuju, in Bungo, *Z. Tashiro s.n.* (KYO!).

Japanese name. Kuju-suge.

var. **fulva** Ohwi

C. alterniflora Franch. var. *fulva* Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 11: 367 (1936). –*C. sachalinensis* F. Schmidt var. *fulva* (Ohwi) Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 68 (1953). –*Carex pisiformis* Boott var. *fulva* (Ohwi) T. Koyama, Bot. Mag. (Tokyo) 74: 328 (1961). –*Carex pisiformis* Boott subsp. *fulva* (Ohwi) T. Koyama in Kitam. & al., Coloured Ill. Herb. Pl. Jap. 3: 269 (1964), nom. nud. —**Lectotype**. JAPAN. Cacumine, Chokaisan in Ugo, *S. Muramatsu s.n.* (KYO!), **hic designatus**.

Japanese name. Ki-ito-suge.

Note. Ohwi (1936) cited three specimens in the original description. Among them, *S. Muramatsu s.n.* (KYO) from Chokaisan was annotated as ‘Type’ in his own hand and matches the description well. Masaki *et al.* (2006) cited this specimen as the holotype of this variety, but the phrase ‘designated here’ was not included. Thus the lectotypification is achieved here.

var. **rubrovaginata** J. Oda & Nagam. **var. nov.** (Fig. 2A–D)

C. sikokiana auct. non Franch. & Sav.: Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 6(5): 259 (1931); Ohwi, Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 11: 365 (1936); Akiyama, Consp. Caric. Jap.: 145 (1932); Akiyama, Caric. Far East. Asia: 196 (1955); Masaki & al., J. Jap. Cyperol. 12: 12 (2006).

C. sachalinensis F. Schmidt var. *sikokiana* auct. non (Franch. & Sav.) Ohwi: Ohwi, Bull. Natl. Sci. Mus., Tokyo 33: 67 (1953).

C. pisiformis Boott var. *sikokiana* auct. non (Franch. & Sav.) T. Koyama: T. Koyama, Bot. Mag. (Tokyo) 74: 329 (1961).

C. alterniflora Franch. var. *sikokiana* auct. non (Franch. & Sav.) Katsuy., nom. nud.: Katsuy., Carex Jap.: 217 (2005) ut ‘(Franch. & Sav.) Ohwi’.

A typo vaginis basilaribus rubro-fuscis et squamis masculis seltem partim rubro-fuscis differt.

Typus. JAPAN. Kongo-san, Prov. Kawachi (Osaka Pref.), 29 Apr. 1928, *Z. Tashiro s.n.* (KYO).

Plants, stoloniferous. *Rhizomes* loosely tufted. *Culms* central, 20–50 cm long, obtusely trigonous, smooth. *Leaves* V-shaped, soft, shorter than culms at anthesis, as tall as culms later, ca. 2 mm wide; basal sheath bladeless or shortly phylloid, reddish purple brown, lucid, the membranous front part dark reddish brown. *Spikes* 3–5, erect; terminal spike staminate, linear, 2–3 cm long; lateral spikes pistillate, cylindrical, loosely flowered, remote; bract sheathing and foliaceous, overtopping the spike. *Staminate scales* narrowly obovate, mucronate, at least partly reddish purple brown, dorsal part green, 4–6 mm long. *Stamens* 3. *Pistillate scales* obovate, cuspidate, pale brown to at least partly reddish purple brown, dorsal part green, 2.5–3.5 mm long. *Perigynia* obovate, 15–20-nerved, smooth, dull green, 3–3.5 mm long, abruptly tapering to the sometimes scabrous beak; mouth of beak shortly bidentate. *Achenes* obovoid, 1.5–2 mm long; terminal part with sessile discoid appendage. *Stigmas* 3.

Japanese name. Beni-ito-suge (Kansai-oh-ito-suge)

Habitat. Mesic edges of broad-leaved evergreen forests.

Distribution. Japan (Honshu [Kinki and Chugoku Districts], Shikoku and Kyushu), Korea (Jeju-do).

Other specimens examined

JAPAN. **Honshu**. Kyoto: Ponpon-yama, Oharano, Kyoto-shi, *S. Tsugaru & T. Takahashi 24659* (KYO). —Osaka: Katsuragi-san, Prov. Kawachi, *Z. Tashiro s.n.** (KYO); Kongo-san, Prov. Kawachi, *S. Sakaguchi 33** (KYO); Makio-san, Prov. Idzumi, *Z. Tashiro s.n.*** (KYO). —Hyogo: Yumesaki-cho, Shikama-gun, *T. Kobayashi 10373* (KYO); Seppiko-san, Yumesaki-cho, Shikama-gun, *G. Murata 22194* (KYO); Kanaji, Kamigori-cho, Akou-gun, *N. Kurosaki 19319* (KYO). —Nara: Iwahashi in Ugashi-mura, Uda-gun, Prov. Yamato, *G. Murata & T. Shimizu 257-B* (KYO); Shichimendani, Gojo-shi, *J. Oda 1935* (KYO). —Wakayama: Aritagawa-cho, Arita-gun, *S. Yamamoto 24030* (KYO); Koyasan, Ito-gun, *J. Oda 1642* (KYO). —Okayama: Nitta, Bizen-shi, *T. Yoshizawa 9840* (KYO); Nakai-dani, Tetsuta-cho, Atetsu-gun, *S. Tsugaru 2982* (KYO). —Hiroshima: Akiota-cho, Yamagata-gun, *T. Hoshino et al. 21392* (KYO). —Yamaguchi: Chifuku, Abu-gun, *K. Oka 19891* (KYO). **Shikoku**. Ehime: Omogokei, Kamiukena-gun, Prov. Iyo, *J. Wada s.n.*** (KYO); Shiraitoge, Prov. Iyo, *S. Yagi s.n.** (KYO); Nametoko-yama, Prov. Iyo, *S. Ishikawa s.n.** (KYO); Iwayadera, Prov. Iyo, *S. Ishikawa s.n.** (KYO); Saragamine, Prov. Iyo, *M. Ogata s.n.** (KYO). —Kochi:

Tanono to Onogahara, Yuzuhara-mura, *G. Murata & T. Shimizu 2532* (KYO). **Kyushu.** Fukuoka: Seburiyama, Prov. Chikuzen, *H. Ichikawa s.n.** (KYO); Minamihatamura, Prov. Chikushi, *Y. Toki s.n.** (KYO); Hiko-san, Soeta-cho, Tagawa-gun, *Y. Koga 12637* (KYO). —Kumamoto: Seiei-zan, Takamori-cho, Aso-gun, *N. Kurosaki 6727* (KYO). —Oita: Minamiyamada-mura, Kusu-gun, Prov. Bungo, *K. Ikebe s.n.** (KYO).

KOREA. **Jeju-do**. Ins. Quelpaert, *J. Ohwi 9308*** (KYO).

*cited in Ohwi (1931 & 1936) as *C. sikokiana*. **cited in Ohwi (1936) as *C. sikokiana*.

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